

Undrained Shear Strength Of Soft Clay Mixed With Different Percentages Of Lime And Silica Fume

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ABSTRACT

Soil stabilisation, as a cost-effective and environmentally friendly method, is used in the building of systems like roads, dams, canals and river levels. Chemical stabilisation of soil is carried out by adding binder or by-products like lime and silica fume to the soil thereby modifying the geotechnical performance of the soil. Various researchers have carried out research on the properties of soil, such as its compaction, compressibility, hydraulic conductivity, and strength characteristics. The focus of the study was the determination of the physical properties of the soft clay used and the strength of soft clay (kaolin) mixed with 6 % of silica fume and various percentages (3 %, 5 %, 7 % and 9 %) of lime. Unconfined compression test was carried out on the soft clay and the mixtures of soft clay-lime-silica fume to investigate the effect of lime stabilisation with silica fume additives on the unconfined compressive strength of the mixtures. Based on the results obtained, all soil samples were indicated as soils with medium plasticity. From 0 % to 9 % of lime with 6 % of silica fume, the decreased in the maximum dry density was by 5.92 % and the increased in the optimum moisture content was by 23.5 %. Decreased in the coefficient of permeability of the mixtures occurred when compared to the coefficient of permeability of the soft clay itself. The improvement in shear strength of soft clay mixed with 6 % silica fume and 5 % lime was 29.83 % compared to the shear strength of the soft clay sample. The optimal percentage of lime-silica fume combination was attained at 5.0 % of lime and 6.0 % of silica fume in order to improve the shear strength of soft clay. It can be concluded that lime-silica fume additives improved the unconfined compressive strength of the soft clay.

KEYWORDS: Undrained shear strength; soil stabilisation; soft clay; silica fume; lime

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